

Note: There will be 8 assignments throughout the term. Each assignment is worth 8% of your final grade. Your lowest assignment grade will be dropped providing a total for the assignment component of your final grade as 56%.

Note: Please adhere to the stated expectations: "I expect that you'll interact with your colleagues throughout the course, in discussing any readings, during class, or in considering any assignments. However, your submitted assignments should reflect and be of your own individual work."

Note: When searching online you shouldn't need to request custom pricing or quote information. That is, for questions requiring online work, only use information that is readily available online.

*Note: Unless otherwise noted each assignment is due at the *beginning* of the class following its assignment. Please submit your assignment either as hard copy or by email attachment to endy@stanford.edu.*

Note: Please send any questions about this assignment by email to endy@stanford.edu. I'll try to respond in real time.

Part 1. The first part of the assignment is designed to give you at least some familiarity with online databases containing (mostly natural) DNA sequences. Start by finding the DNA sequence associated with NCBI Accession Number NC_002058.

- What organism is this DNA sequence taken from? (hint: try "Googling" the accession number).
- How many base pairs comprise this specific DNA sequence?
- Is the DNA sequence part of the organism's genome or the entire genome?

Part 2. Next, work through what it would take to construct NC_002058.

- How many oligonucleotides would you need to purchase in order to assemble NC_002058? (Hint: you will need to define your oligos' average length and oligo-oligo overlap)
- What would it cost you to order all of these oligonucleotides? (Hint: Integrated DNA Technologies, Inc. is one good custom oligo supplier, but there are many others online). Document your pricing by including a URL to pricing with your assignment.
- How much would it cost you to order NC_002058 as a single "gene-length" construct? (Hint: search "gene synthesis"). Be careful to confirm that the custom "gene synthesis" service you choose can deliver a sequence up to the full length of NC_002058. Again, document your pricing by including a URL.
- Based on information available online, how much time do you think that it would take to assemble NC_002058 from oligos? How long do you estimate it would take for a full-length "gene" synthesis order to be delivered?

Part 3. Returning to the NCBI's "Nucleotide" and "Genome" databases:

- What is the most interesting or important DNA sequence that you can find? Provide the sequence's NCBI Accession Number and sequence length. What would it cost you to construct this sequence?
- What is the most frightening or dangerous DNA sequence that you can find? As before, provide the sequence's NCBI Accession Number and sequence length. What would it cost you to construct this sequence?

Part 4. Read the following pair of one-page editorials.

"Recipe for Destruction" by RAY KURZWEIL and BILL JOY

<http://www.nytimes.com/2005/10/17/opinion/17kurzweiljoy.html>

"1918 Flu and Responsible Science" by PHILLIP A. SHARP

<http://www.scienceonline.org/cgi/content/short/310/5745/17>

- a. Do you believe that the genome sequences of pathogens should be freely available online? (yes or no)
- b. Why? (please limit your reasoned answer to 250 words or less)